

## CLAIMS

I claim:

1. A biological treatment system comprising:
  - a wastewater system drain field;
  - 5 at least one perforated distribution pipe located within the drain field and adapted to receive effluent; and
    - at least one perforated outer pipe surrounding the at least one distribution pipe to receive effluent from the at least one distribution pipe and to dispense the effluent to the drain field after it has been biologically treated in the at least one outer pipe.
- 10 2. The biological treatment system of claim 1, wherein the at least one distribution pipe is located adjacent an inside bottom surface of the at least one outer pipe.
3. The biological treatment system of claim 1, wherein the perforations of the at least one distribution pipe are spaced along a bottom portion of a length of the at least one distribution pipe.
- 15 4. The biological treatment system of claim 1, wherein the perforations of the at least one outer pipe are spaced along opposite sides of the outer pipe.
5. The biological treatment system of claim 1 further comprising at least one perforated gas delivery pipe positioned within the at least one outer pipe and being adapted to receive gas containing oxygen such that the gas is distributed within the at least one outer pipe 20 to interact with the effluent.
6. The biological treatment system of claim 5, wherein the at least one gas delivery pipe is located above the at least one distribution pipe.
7. The biological treatment system of claim 5, wherein the at least one perforated gas delivery pipe is in fluid communication with a gas delivery header pipe.
- 25 8. The biological treatment system of claim 5, wherein the at least one gas delivery pipe is located below the at least one distribution pipe.
9. The biological treatment system of claim 5, wherein the at least one gas delivery pipe is at least one diffuser.
10. The biological treatment system of claim 1, further comprising a barrier located 30 above the at least one outer pipe which isolates and insulates the at least one outer pipe from a surrounding environment.

11. The biological treatment system of claim 10, wherein the barrier is at least one of a geofabric, a geomembrane and includes both a geofabric and geomembrane.

12. The biological treatment system of claim 1, further comprising at least one perforated flushing pipe positioned within the at least one outer pipe and adapted to receive 5 liquid and discharge the liquid to the at least one outer pipe.

13. The biological treatment system of claim 12, wherein the perforations of the at least one flushing pipe are spaced along one end of the at least one flushing pipe.

14. The biological treatment system of claim 13, wherein the at least one flushing pipe is in fluid communication with a flushing header pipe.

10 15. The biological treatment system of claim 5, further comprising at least one perforated flushing pipe which is located between the at least one distribution pipe and the at least one gas delivery pipe.

15 16. The biological treatment system of claim 1, further comprising a tank in fluid communication with the at least one distribution pipe for allowing effluent to pass from the tank to the at least one distribution pipe.

17. The biological treatment system of claim 16, further comprising a return pump in fluid communication with the tank to pump effluent from the tank.

20 18. The biological treatment system of claim 17, further comprising a sensor positioned within the tank for controlling a periodic delivery or dosing of the effluent from the tank to the at least one distribution pipe.

19. The biological treatment system of claim 18 further comprising a discharge pump in fluid communication with the tank to deliver the effluent from the tank to the at least one distribution pipe.

25 20. The biological treatment system of claim 1, further comprising at least one of a packing material and a media such that the packing material and the media are located within the at least one outer pipe.

21. The biological treatment system of claim 1, wherein the drain field is a gravelless drain field assembly within which the at least one outer pipe is located.

22. A method of biological treatment comprising the steps of:  
30 (a) supplying effluent to at least one perforated distribution pipe;  
(b) discharging the effluent through the at least one perforated distribution pipe;

(c) receiving the effluent in at least one perforated outer pipe surrounding the at least one distribution pipe such that the effluent experiences biological treatment; and

(d) passing the biologically treated effluent from the at least one perforated outer pipe to a wastewater drain field within which the at least one outer pipe is located.

5 23. The method of claim 22 further comprising the step of delivering gas to the at least one outer pipe to interact with the effluent.

24. The method of claim 23, further comprising the step of controlling at least one of: the effluent to the at least one outer pipe; the gas to the at least one outer pipe; and temperature of the effluent within the at least one outer pipe.

10 25. The method of claim 22, further comprising the step of delivering liquid to the at least one outer pipe to flush the at least one outer pipe.

26. A method of flushing a biological treatment system, comprising the steps of:

(a) positioning at least one perforated flushing pipe adapted to receive liquid within at least one outer pipe;

15 (b) connecting a vacuum system to an end of the at least one outer pipe;

(c) starting the vacuum system; and

(d) supplying the liquid to the at least one flushing pipe such that the liquid is distributed within the at least flushing pipe and received by the outer pipe before being removed by the vacuum system.

20 27. A method of biological treatment comprising the steps of:

(a) supplying effluent to at least one vessel positioned within a wastewater drain field;

(b) delivering gas to the at least one vessel to interact with the effluent such that the effluent experiences aerobic biological treatment; and

25 (c) passing biologically treated effluent from the at least one vessel to the wastewater drain field.

28. The method of claim 27, further comprising the step of controlling at least one of: the effluent to the at least one vessel; the gas to the at least one vessel; and temperature of the effluent within the vessel.